UNBOUND NOTES AND DRAWINGS
UNDATED, CA. 1889

Take Charcoal heat End lay on
Crystal Nitrate Silver its reduced
which continues incandescence +
Metallic Silver takes place of
Charcoal preserving its form
Chandler Says has made pieces
Silver Weight oz showing cells +
rings of the wood Charcoal
Try this with Nitrate Lead
also oxide also use very
porous Charcoal soak in
Sat Sol of Lead Salt dry
+ resat + dry then heat
in tube + reduce lead until
Charcoal gone == Try Mixing
oxide with Lead Oxide reduce by
H + Extra Earthy metal Earthy ox by SO_4

[illegible]

Try 10 pct Sol Hydrofluoric acid in
Secy Bat — also see if Chloric
or Chlorous + Hypochlorous acid
wont replace SO_4 — in Storage Bat.
also arsenic acid —

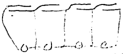
Try stick iron + carbon moulded
in peroxide Lead + heat
so charcoal reduces PbO
get current direct low head

Direct Conversion permanganate of
Soda Crystals little or no H_2O +
strong SO_3 — this almost sets
wet coke on fire = use live ~~[illegible]~~ Carbon
dif quantities " Try Lead + Carbon
etc =

Sketches + notes

Non sparking Dynamo

description 278 413,
" 283983



Patented
304085

also later pat
several stations
in series

340 709
287,511
298 955 non spkg
Case 556 - mkg carbon Bernstein
Case 559 - Monometer.
307,030

OVER

Case 589 - protection lighting
in pat 304084

Edison Kinney Stock Printer
314 115
Edison " Autographic
347097

Motograph Relay
with Telephone Dia –

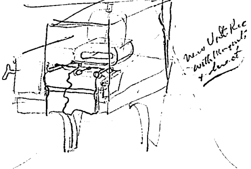
Motograph Mirror gal

Case 654 — with modern
phonoplex –

658 —

Cable Sounder & Telephone
b key Ckt at Terminal
station.

Carbon in Vac Mirror.


new Unit Rec
with Magnets
+ [illegible]

(Sketches & Notes — R. R. Signalling ?) (1889)

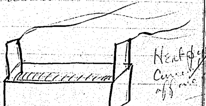
~~Heating pyrites so as to drive off free sulphur -~~

~~Reduce pyrites by Current to Monosulphide only on surface to make sufficiently magnetic.~~

~~Treat pyrite with hot Soda Lye to take free sulphur away~~

~~Pyrites in Vac with Hg — Wash pyrites clean of sulphur by stirring in pan with steam but not enough attrition to break fresh surfaces — Use of Dry washed pyrites.~~

~~Iodine in Bisulphide Carbon -~~



~~Heat pyrites by Current to drive off free sulphur~~

THE

Notes

Mucic acid when Carbonized leaves charcoal almost like metal in lustre,

All Nitrogenized Organic Compounds when heated with Excess aqueous fixed alkali give off their N as NH. & 2 atoms H_2O take their place hence claim this process for treating fils of Nitrogenous subs like hair horn albumen glue.

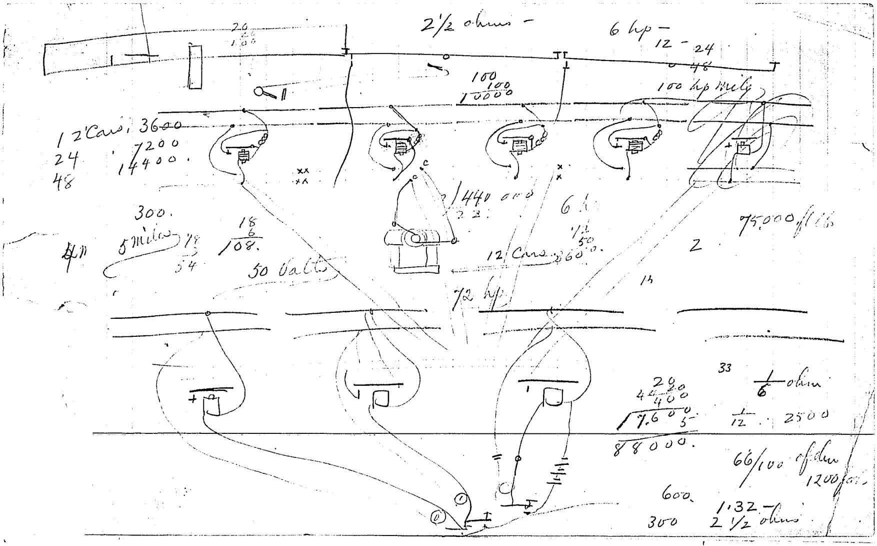
Azo diazo Compounds

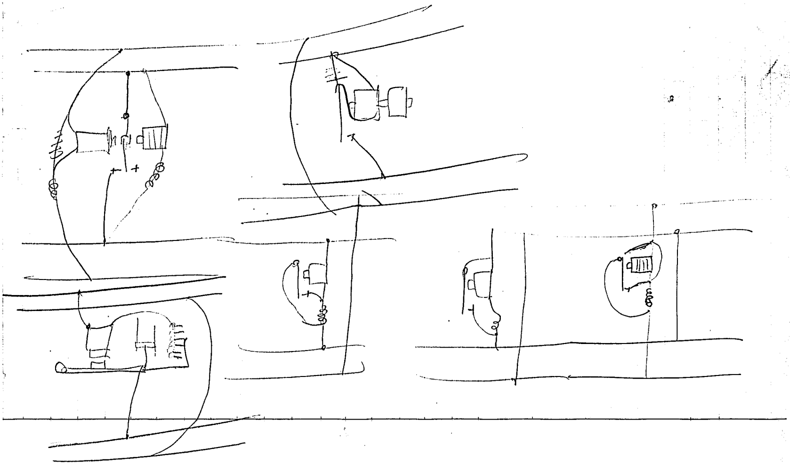
Phlorizein infusible Carbzs without fusion or Volatiztn. Gmelin p 17 Vol X
Rubean Gmelin

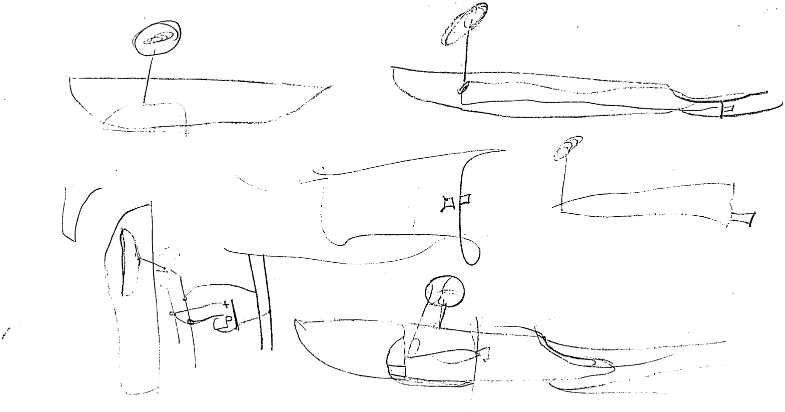
Paramide clay like. Carbzs without melt
Vol 4 p 16

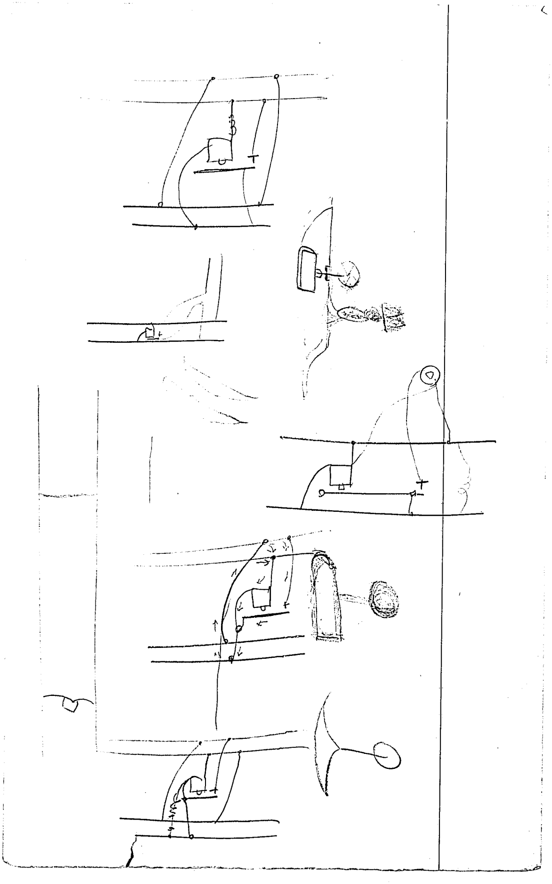
Patent

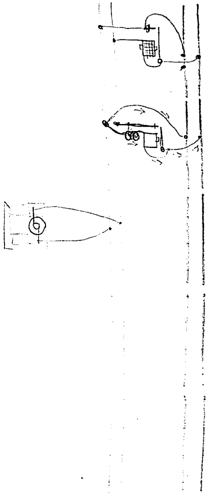
Double Concentrating

2/2 ohms -
6 hp -
12 - 24
48
20
20
100
100
100
10000
100 hp mile
12 Cars, 3600
24 7200
48 14400.
xx
xx
c
c
1440 amo
22.
6
75,000 ft lbs
300.
5 miles 18
3
54
18
6
108.
1/2
50
12 Cars 360 0.
2
50 Volts
1/2 hp
13
33
1/6 ohm
2 00
4 00 00
4 00
17.6 00 0
5
88000.
1/12 2500
66/100 of ohm
1200 ft.
600.
1.32 -
300 2 1/2 ohms
①
①







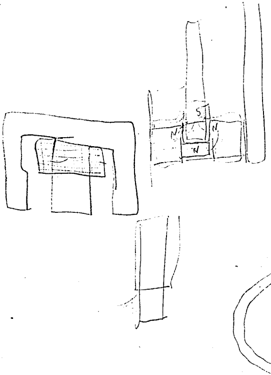


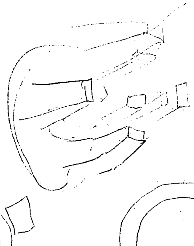
100

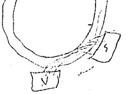
314
6
1884
942
12/113.04
62
926
113
1356

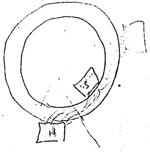
0

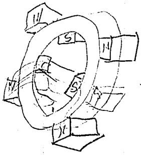
600 Ri 1200

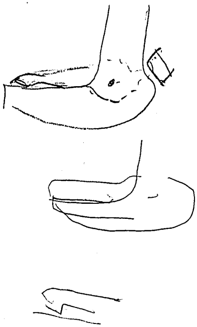


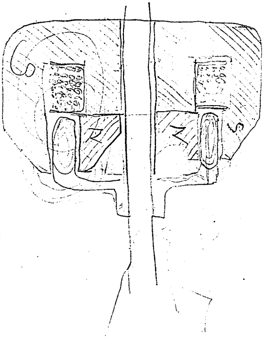


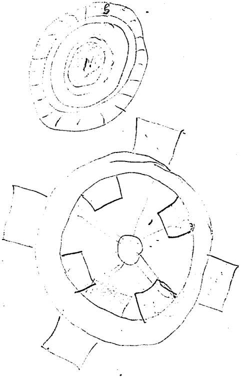









S
N
N
S

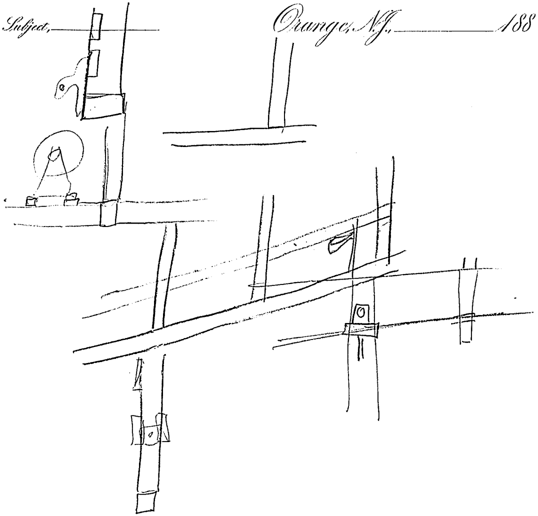

S
N

Cable Address "Edison, New York."

From the Laboratory
of
Thomas A. Edison.

Subject,

Orange, N.J., 188



Gigs –
arbors
Mills –
Monitor tools,
Moulds –
Punch dies –

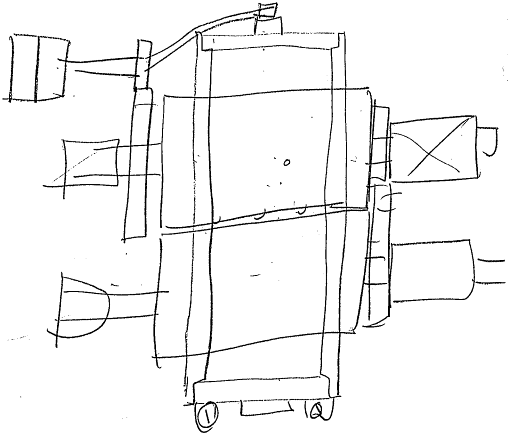
PHONO.

NON EXP. DRAWINGS

Cable Address "Edison, New York."

From the Laboratory
of
Thomas A. Edison.

Subject, ______________ Orange, N.J., ____________ 188



1125 lb.

·0075

17·2

175
75
875
1225
13.125

125
80
10000

550

·125
20

550)2500(4·5
2200
3000

13·125/1125/

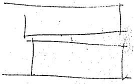
1125)13125(11
1125
1875
117

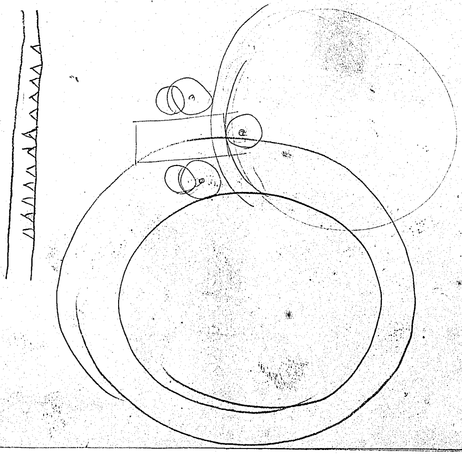
PHONO. 1889
MANUFACT. SKETCHES

Cable Address "Edison, New York."

From the Laboratory
of
Thomas A. Edison.

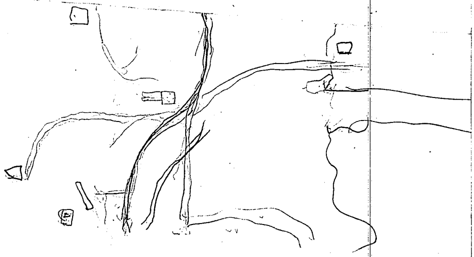
Subject, ________ Orange, N.J., ________ 188





Use of Caustic soda in a Blue Vitriol battery
Leucine or Glycine added as these agents
prevent precipitation of Cupric Hydrate.
Hence lower resistance.
~~Acetate ammonia~~.
Pentasulphide of ammonia as fil reagent—

Nickel Stills for Concentrating Sul acid
with still made to Eliminate H by Dynamo
prevent Oxidation High Volts or
Condg cold & decompg Water, Carbon
plates or Even Lead plates.
Oxidized paraffine being boiled with
Mixture Bichrom P & Sul acid forms
Cerotic acid for phono Cylinder



Mr. Edison —

Bobbin run & magnet iron in place
& brushes in strongest place

Current 49 amperes through armature 22
~~41 " " "~~ [illegible]
28 " " " 19
15 " " " 10

When the iron entirely taken away
Current 50 amp.— through arm. 35
" 41 " " " 30
28 " " " 22
16 " " " 14

Same thing wherever brushes put

CB

A little variation in speed but this will probably give sufficient data

CB

~~70~~

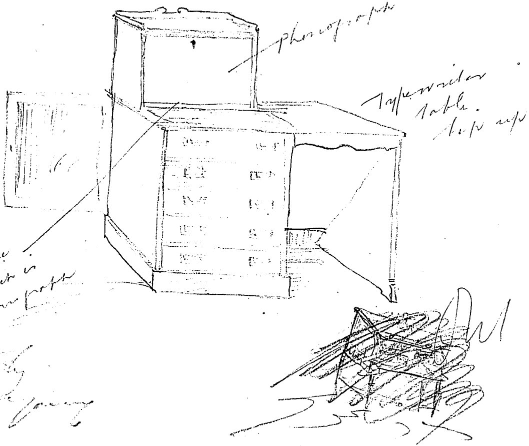
77 cts

65 "

$20 000 on [illegible]
2500 sh. Tools

2¼ ?

phono - sketches

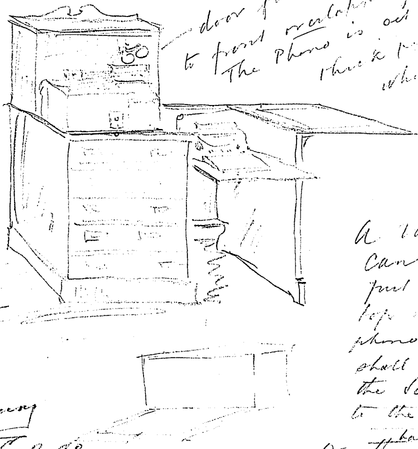


Phonograph
Cupboard for Battery
Typewriter table. lifts up
slide on which is Phonograph

[illegible]

Sketched by
[illegible]
E P C

[illegible]



door falling on to front overlapping

The Phono is set on a thick piece wood which slides out in runners

A rod can be put through top behind phono which shall raise the Selection to the [illegible] battery

or the door can open at side as in sketch A

Design & Sketch by Owen Young

E R [illegible]

[illegible]

SK + Notes

14 —

5 grms Carbonate.

1 gram Syrian dissolved in 48 grms Clean Chloro – No CHg –

OK

---

15 –

5 grms Carbonate
500 Milgm Syrian
25 grams 2 per cent Sol CHg – making 10 grms CHg —

23.

Left over

5 grms Carbonate
1250 Milgms [illegible]
25 grams CHg 2 per cent Sublimate to make 10 per cent of CHg to the Carbonate.

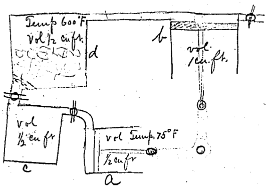
Phono- notes

English [illegible]
price of battery cords 75^d
funnels - costumes
Indian, Speaking tubes
to North American and
The actual cost to us

£

	Cost	
Battery Cords	.42	75
Rec Funnels	1,75*	3.50
Ref "	.50*	100
Test Tubes	27½	45
Flask	.37	70

* * Estimated



Problem :- To find the amount of work that the piston is capable of doing under the assumed conditions

or How much power may be taken off of the shaft and yet keep the machine moving.

Assumptions :-

Stroke of pistons 1 ft = 12"
Area of piston a = ½ sq ft. = 72 sq in.
" " " b = 1 sq ft. = 144 sq. in
Vol of cyl. a = ½ cu ft = 864 cu in.
" " " b = 1 cu ft. = 1728 cu in.
Vol of receiver c = ½ cu ft. = 864 cu. in
(" " heater d not occupied by charcoal) = ½ cu ft. = 864 cu. in.

The work done upon 1 cu. ft. of air (.0743 lbs) in compressing it from 1 cu. ft. at 75°F to ½ cu. ft. without change in heat supply will be. (Röntgen P. 323)

$L_c = 183.36 \times .0743 \times 534 \times (1.3278 - 1)$

$L_c = 2384$ ft. lbs. ✓

The rise in temp. would be from 75°F or 534°F abs.

to 534 × 1.3278 = 709° absolute
or 250°F ✓

In Receiver.

Now .0743 lbs occupies ½ cu. ft. and is at a temp. of 250°F and under a pressure of 2.66 × 14.7 = 45.7 lbs absolute or 31 lbs guage. ✓

This ~~gas~~ air now expands to ⅔ cu ft into the heater and raises in temperature to 600°F

Assuming that this expansion takes place before the rise in temp and entirely independent from it. Assuming also that the ½ cu ft of gas already in the heater is at 600°F we then have for the pressure weight and temperature of the gas in the receiver and heater

pressure = p_3 = 33.5 lbs

~~since p_3/p_2~~ = 3

since $\frac{V_2}{V_3}$ = 1.25 then p_3/p_2 = 1.3636
from table Rontgen P. 171.

Temp = .9145 × 709° = 648° abs
= $\overset{199°}{189}$°F.

Weight = .0814 lbs.

This air is next heated to 600°F.
or 1059° abs.
during this change in temp the rise in pressure will be

$T_2/T_1 = \frac{1059}{648} = 1.634$

$\frac{p_2}{p_1}$ = ~~5.5~~ 1.98

5.8.212 lbs abs.
Pressure will be ~~184.25 lbs abs~~
or ~~169.55 guage~~

This gas at temp 1059° abs and pressure 184.25 lbs abs and volume 1 cuft. and weight .0814 lbs is then expanded to 2 cu ft
What work is done?

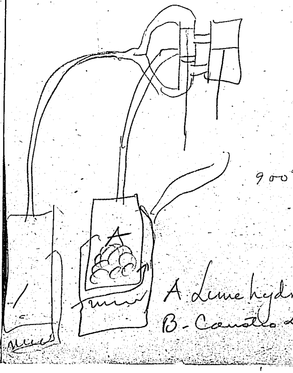
Initial pressure 184.25 lbs ~~per~~ sq in
terminal pressure $\frac{184.25}{2.65}$ = 70 lbs
Kent P. 501 b
R = 184.25 ÷ 70 = 2.65
M. E. p. from 14 lbs initial = 15.5
184.25 ÷ 14 = 13.1
15.5 × 13.1 = m E p from

Work done during expansion from 1 cu ft to 2 cu ftr. will be (Kent 501 a)
2.463 × 184.25

Assume first that all clearances are zero - that there is no waste or leakage and no friction.

Temp. of external air 75°F
" " heated charge 600°F

That all walls are nonconducting:



A. Lime hydrate
B - Caustic Lime -

Heater 1/8 cubic unit
Receiver 1/4 " "
Compressor 1/2 " " compressing 3/4 [illegible] to 1/4 resulting press. 44.1#

Initial press. $\frac{.75-x}{.25} = \frac{.125+2x}{.125}$

$75 - x = 25 + 4x$
$5x = 50$
$x = 10$ $y = \frac{10}{75} = 13.33$
$100 - y = 86.67$
$44.1 \times 86.67 = \underline{38.22}$#

1/4 Stroke $\frac{75-x}{25} = \frac{.125+2x}{375}$

$225 - 3x = 25 + 4x$
$7x = 200$
$x = 28.57$ $y = \frac{28.57}{75} = 38.1$
$100 - y = 61.9$
$44.1 \times 61.9 = \underline{27.3}$#

1/2 Stroke $\frac{75-x}{25} = \frac{125+2x}{625}$

$375 - 5x = 25 + 4x$
$9x = 350$
$x = 388$ $y = \frac{388}{75} = 51.7$
$100 - y = 48.3$
$44.1 \times .483 = \underline{21.3}$#

3/4 Stroke $\frac{75-x}{25} = \frac{125+2x}{875}$

$525 - 7x = 25 + 4x$
$11x = 500$
$x = 4545$ $y = \frac{45.45}{75} = 60.6$
$100 - y = 39.3$
$44.1 \times y = \underline{17.33}$#

Work done in compressing one cu. foot of air ~~from 1 atmos. to 2 atmos~~ to 1/2 cu. ft. is 2384 ft. lbs.

This 1/2 cu. ft. is then at a temp. of ~~260~~ 75° if it is then heated to 600° it will be under a pressure of

$$p_2 = p_1 \times \left(\frac{T_2}{T_1}\right)^{2.46} = 29.4 \times \left(\frac{1049}{534}\right)^{2.46} = 29.4 \times 5.502 =$$

$$= 161.76$$

1/2 cu. ft. air under pressure of 161.76 lbs per sq. in. and temp of 1059° abs. if worked expansively down to 20 lbs. absolute or 5.3 gauge would do the following work.
(Its weight = .0743 lbs.)

from fall in temp.

$p_1 = 161.76 = 23293$

$p_2 = 20 = 2880$

$V_1 = .5$

$V_2 = 2.18$

$R = 8$

$T_1 = 1059$

$T_2 = 600$

fall in temp $= 460°$

$.0743 \times \cancel{5} \times 460 \times .169 =$

$.0743 \times 460 \times .169 \times 772 =$

work = 4449 ft lbs.

$p_1 = 161.76 \times 144 = 23293$

$p_2 = 20 = 2880$

$p_3 = 15$

$V_1 = .5$ cu ft.

$V_2 = ? = 2.18$ cu ft.

$R = 8$

Work done. $W = \frac{p_1 V_1}{.418}\left(1 - \left(\frac{V_1}{V}\right)^{.408}\right)$

$$\frac{23293 \times .5}{.408}\left(1 - \left(\frac{.5}{2.18}\right)^{.408}\right)$$

$$\frac{11646}{.408}\left(1 - (.23)^{.408}\right) =$$

$\frac{11646}{.408}(1 - 4577) =$ ~~[illegible]~~ ft lbs. per stroke

2384

9776 gain.

$\frac{11646}{.408}(1 - .55) = 13000$ ft lbs

5000

8000 ft lbs work

2390

5610

5610 ft lbs per stroke

Cost of

Mr Batchelor Toy

Phono—

Labor —	23 ct
Weight of casting	1.13½ oz
Cost	8 9/10 ct
Mica	2
Asembling	10
Total Cost	43 9/10

44
15
59
12
702

Talking drum

Cast Iron 14=½ oz

Operations 14

Cost — 6 cts

Diafram and holder and mouth piece Cast Iron 3½ oz

Mica 2½ inch round

Operations 27

Cost — 3=3/8

Two ¼ inch Clock springs cost 5 apiece 10 cts

Screws Machine	8	
Shoulder Screws	4	
Pent Screws	2	
Set "	2	2 cts

Governor
Weight in Brass 3½ oz
Operations 35
Cost labor ___ 4 = 3/8 cts

Crank spring covers
Bras 1½ oz
Operstions 24
Cost in labor 3 cts
One rubber buton 1½ cts

Stop and friction roler
Operations 7
Cost ___ 7/8 cts

Frame
Cast Iron 5 oz
Operations 24
Cost ___ 3 cts

Springs and throw back gig 3
Cost 3/8 cts

Cost in Brass 8 cts

Cost in Cast Iron 7 cts

Mica 2 cts

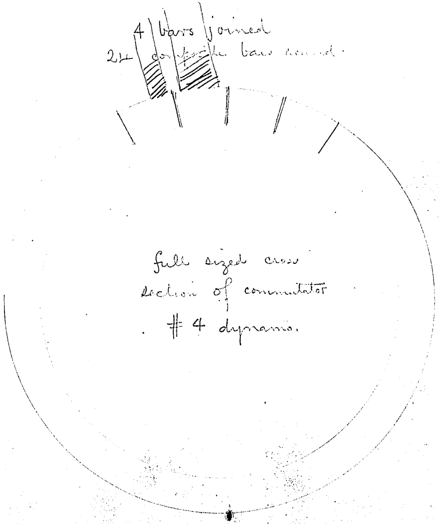
Rubber ring 2 cts

Total Cost 48 cts

Cost of labor 24
" " Material 19
Asembling 10 cts

Cable Address "Edison, New York."

From the Laboratory
of
Thomas A. Edison.
Orange, N.J.


4 bars joined
24 composite bars round.

full sized cross
section of commutator
#4 dynamo.

radius 5" 80 sq. in

24" = 1920 cubic inches

lifted 1 foot = 1 cubic foot

= 65 lbs lifted 1 foot

= 65 foot lbs

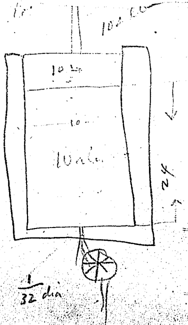
+ 100 lbs lifted 2 feet

= 200 ft lbs

= 265 ft lbs

$\frac{220}{.80}$

400


10 lbs
10
Water
24
1/32 dia

W

2 Volt Winding for

Shommercial Phono

unt Wound

Disks 3 1/2 irmature

Iner Diam ach $\frac{20}{1000}$ Punchings

Div 24

Width .280 2 1/2, Core $\frac{3}{4}$ by .325

Depth .17

Tooth .17

Wire $\frac{22}{1000}$

Turns 4 i e $\frac{2{\cdot}8}{1400}$

Layers 8

Turns in ea

Speed 560 ch div 32

Curren ev per minut

t — 1.6 Amp

Field for 120 Volt
Motor Comercial Phono
Core 1 in Length 1 1/2 in
Spools ~~two~~
Wire $\frac{15}{1000}$ i.e. $\frac{28}{1000}$
Turns 52
Layers 11
Turns on each spool 572
Total 1,144.
Resistance 13 Ohms

Commutator
Dec 24 1900

Field for
2 Volt Motor for Commercial
Phono

Core diam 1 in
" Length 1.½ in
Spools two
Wire $\frac{18}{1000}$ i e $\frac{28}{1000}$
Turns on each spool 52
Layers 11.
Turns 572
Total 1144. Resist 13 Ohms

Commutator
Dec 24. 1900

120 Volt Motor

Series Wound, in series
with One 16 Candle Lamp

Armature

3½ in Diam 2½ inside
Core ¾ by .325
Punchings $\frac{20}{1000}$
Div 24
Width .80
Depth .175
Tooth .178
Wire $\frac{12}{1000}$ i e $\frac{20}{1000}$
Turns 8
Layers 13
Turns in each div 104
Total 496.
Feet in each div 24.5
Total f

Phono Notes

(1889)

#4480 Nov 1st
4 Hearing end pieces
#4484 Nov 2nd
24 Recording do
#4486 Nov 2nd
24 Cutting off Knives
#4521 Nov 5th
2 pr. Commutator Brushes
24 Recording Needles
24 Reproducing do
#4526 Nov 5th
2 pr Commutator Brushes
#4542 Nov 6th
12 .0045 Diaphragms
12 .005 do
#4545 Nov 6
12 Sapphire Cutting off Knives
#4565 Nov 8
6 Idler pulley Shafts
2 armature Shafts
2 pr Commutator Brushes with hard Rubber Insulators
2 Spectacles 4 changed for new ones

#4651 Nov 14
24 Governor Belts
3 Main Phono shaft turned up -
#4657 Nov 14
12 Hinge Frame Springs
2 Main Shafts —
4670 Nov 15th
12 — .005 Diaphragms
12 Driving Belts
3 Commutator Brushes
4677. Nov 16
2 Reproducers with Sapphire needles
6 Sapphire recording needles
24 Rubber Cushions
6 Stopper Brakes —
4691 Nov 18
1 Governor
1 Governor Belt
1 do Top Brush
1 do Side do
2 Commutator do
4692 Nov 18
12 Reproducing Needles
12 Recording do

# 4693. Nov 18.
12 Zincs for Old Bichm Battery.

- # 4728. Nov 19
6 Governor Ball Levers.
3 Cam plates
2 pr Commutating Brushes
24 Governor Contact Levers
24 Governor Shaft do
24 Recording Needles
24 Reproducing do -

# 4754 Nov 21st
6 Governor Belts
6 Main do
One 5th Branch tube

# 4763 Nov 21st
6 Main Shaft Centres
12 pair Oxide plates
24 Soda Battery Zincs
2 Complete Batteries no Cords

# 4765 Nov 21st
6 Swinging arm Centres

# 4790 Nov 23
2 Idler pulleys.
2 - 5 Branch Glasses
- one Governor -

# 4792 Nov 23
2 Soda Battery Jars -

# 4795. Nov 25th
12 Main Belts
_ 18 - 100 Thread Nuts

# 4818. Nov 26
2 Porcelain Covers
4 Soda Battery Frames
_ 2 do do Jars -

# 4858. Nov 30
One armature Pulley
12 Lock Bolts
One Main shaft pulley.
6 Idler pulleys with centres
3 Single Ear tubes
2 Speaking tube latest style
6 Sapphire turning off Knives

# 4864 Nov 30th
12 pr Oxide plates.
24 Soda Battery Zincs

# 4871. Nov 30th
6 adjustment Bushings.
3 armature Shafts.